



Operation Manual

PRODUCT NAME

LUBRICATOR

MODEL / Series / Product Number

AL10-M5(-2,3,6,R,Z)-A

AL20-(F,N)01~(F,N)02(B)(-2,3,6,C,R,Z)-A

AL30-(F,N)02~(F,N)03(B)(-2,3,6,8,R,3W,Z)-A

AL40-(F,N)02~(F,N)04(B)(-2,3,6,8,R,3W,Z)-A

AL40-(F,N)06(B)(-2,3,6,8,R,3W,Z)-A

AL50-(F,N)06~(F,N)10(B)(-2,3,6,8,R,3W,Z)-A

AL60-(F,N)10(B)(-2,3,6,8,R,3W,Z)-A

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.

ISO 4413: Hydraulic fluid power -- General rules relating to systems.

IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)

ISO 10218: Manipulating industrial robots -Safety.

etc.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Safety Instructions

Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction(WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Precautions for design

⚠ WARNING

- ① Consult SMC if no leakage is allowed due to the environment, or operating fluid is not air.
- ② External parts including the bowl, sight dome (Material: polycarbonate) are made of resin. Organic solvents including synthetic fluid, chemicals including acetone, alcohol, ethylene chloride, sulphuric acid, nitrate, hydrochloric acid, cutting oil, kerosene, gasoline, lock material of screw are harmful. Do not use the lubricator where containing those.

Effects organic solvents and chemicals, and where these elements are likely to adhere to the equipment.

Chemical data for substances causing degradation (Reference)

Type	Chemical name	Application examples	Material	
			Polycarbonate	Nylon
Acid	Hydrochloric acid Sulphuric acid, Phosphoric acid Chromic acid	Acid washing liquid for metals	△	×
Alkaline	Sodium hydroxide (Caustic soda) Potash Calcium hydroxide (Slack lime) Ammonia water Carbonate of soda	Degreasing of metals Industrial salts Water-soluble cutting oil	×	○
Inorganic salts	Sodium sulphide Sulphate of potash Sulphate of soda	—	×	△
Chlorine solvents	Carbon tetrachloride Chloroform Ethylene chloride Methylene chloride	Cleaning liquid for metals Printing ink Dilution	×	△
Aromatic series	Benzene Toluene Paint thinner	Coatings Dry cleaning	×	△
Ketone	Acetone Methyl ethyl ketone Cyclohexane	Photographic film Dry cleaning Textile industries	×	×
Alcohol	Ethyl alcohol IPA Methyl alcohol	Antifreeze Adhesives	△	×
Oil	Gasoline Kerosene	—	×	○
Ester	Phthalic acid dim ethyl Phthalic acid diethyl Acetic acid	Synthetic oil Anti-rust additives	×	○
Ether	Methyl ether Ethyl ether	Brake oil additives	×	○
Amino	Methyl amino	Cutting oil Brake oil additives Rubber accelerator	×	×
Other	Thread -lock fluid Seawater Leak tester	—	×	△
○ : Essentially safe △ : Some effects may occur × : Effects will occur				

When the above factors are present, or there is some doubt, use a metal bowl for safety.

- ③ Avoid the application where charge and discharge of pressure to standard bowl is switched frequently. This may damage the bowl. For this kind of application, the metal bowl is recommended.
- ④ Protect from ultra violet ray and radiation heat by shield.

Selection

⚠ WARNING

- ① Consult SMC if using this product for purposes other than its primary use of lubricating air line equipment.
- ② The use at high frequency such as the use in press machine may damage internal components and cause operating failure of the equipments installed to outlet side. Contact SMC for such a use.
- ③ Small air consumption may prevent the oil from dropping. Confirm air flow necessary to produce the drops required for the correct amount of oil.
- ④ Do not supply the air from outlet side (reverse air flow). Otherwise, internal components may be damaged.
- ⑤ If piping is branched at inlet side, the oil may flow back. Avoid the reverse flow by installing a check valve (AKM series) to inlet side.

Installation

⚠ CAUTION

- ① Do not drop nor apply impact during transportation or installation. This can cause damage to the product.
- ② Do not install in areas of high humid or high temperature. It causes damage of the product and malfunction.
- ③ Connect the lubricator ensuring the direction of 「1」 " (IN) and 「2」 " (OUT) for air direction or an arrow. Wrong connection may cause malfunction.
- ④ Install the bowl vertically with bowl facing down. If it is inclined, dripping may not be confirmed.
- ⑤ Make space to provide easy access at the bottom of the product when replacing bowl or draining. The required space is shown on 「11. DIMENSIONS」 (P26).

Adjustment

⚠ WARNING

- ① Adjustment of the oil adjustment valve should be carried out manually. The use of tools, etc. can result in damage to the unit.(AL20-A~AL60-A)
- ② Turning the oil adjustment valve counterclockwise increases the dripping amount, and turning it clockwise reduces the dripping amount. From the fully closed position, three rotations will bring it to the fully open position. Please do not rotate it any further than this.
Note that the numbered scale markings are guidelines for adjusting the position, and not indicators of the dripping amount.(AL20-A~AL60-A)
- ③ On AL10-A, some dripping may occur even when needle is fully opened.

Piping

⚠ WARNING

- ① Blow out or clean piping before piping to eliminate swarf, cutting oil, solid foreign material. Contamination of piping may cause damage or malfunction.
- ② When installing piping, avoid chips and sealing materials from piping screws entering the inside of equipment. Or malfunction may occur. When use sealing tapes, leave 1.5~2 threads of the end of thread exposed.
- ③ Hold the female screw side and screw in piping with recommended tightening torque. Insufficient tightening torque lead to cause loose piping or sealing failure. Excessive torque may lead to cause screw breakage. Tightening without holding female screw side applies excessive force to the piping bracket which lead to cause breakage.

Recommended torque unit: N·m

Screw	M5	1/8	1/4	3/8	1/2	3/4	1
Torque	*1	7~9	12~14	22~24	28~30	28~30	36~38

*1: First, tighten it by hand , then give it an additional 1/6 turn with a wrench.

- ④ Do not apply any torsional moment, or bending moment except the weight of the lubricator itself. External piping needs to be supported separately. Hard piping like steel tube is susceptible to excessive moment load or vibration. Insert the flexible tube to cancel the influence.
- ⑤ Before using an SMC fitting and S coupler, please refer to "Tightening the threaded portion of the connection thread" of the Fittings & Tubing Precautions.
- ⑥ Increase the cylinder volume in relation to the tube capacity between the solenoid valve and the cylinder. If the cylinder capacity is less than that of the tube connecting the cylinder and solenoid valve, there is a chance that oil may not be carried correctly.



CAUTION

- ① Avoid rising piping and piping branches on secondary side. Otherwise, lubricating failure may be caused.

Air Source



CAUTION

- ① Use clean air. Compressed air containing chemicals, organic solvent, synthetic oil or corrosive gas may lead to cause breakage of parts or malfunction.
- ② Air containing too much moisture may cause malfunction. Install the air drier or the aftercooler before the lubricator.

Maintenance



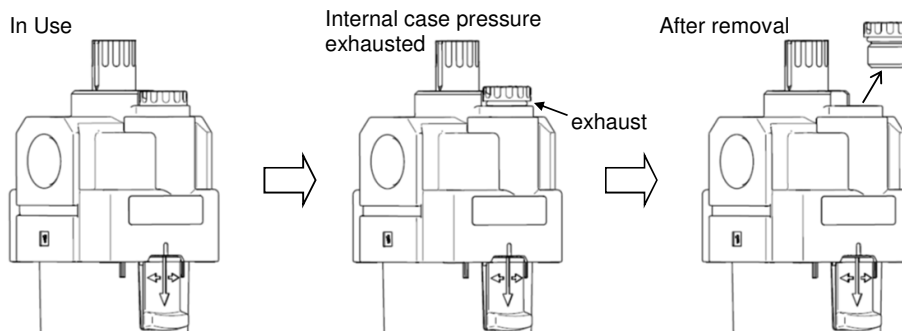
WARNING

- ① Maintenance and checks should be done by following the procedure in the operation manual. Incorrect handling of the product may cause breakage or malfunction of the equipment or device.
- ② Open and close drain cock manually. Open and close too much may damage the drain cock.
- ③ Perform periodical check to find cracks, flaws or other deterioration on resin bowl and the sight dome. If any of them is seen, as malfunction is caused, replace with new bowl or the sight dome.
- ④ Check for dirt in resin bowl periodically. If any dirt is seen, replace with new bowl. And if removing off the dirt by washing instead of using a replacement, never use washing material other than neutral detergent. Otherwise, the bowl is damaged.
- ⑤ Use class 1 turbine oil (without additives) ISO VG32. Using other lubricant can cause damage to devices and result in malfunction.
- ⑥ The AL10-A and AL20-A cannot supply oil under pressure.
After releasing the inlet pressure and checking that there is no internal pressure in the case, remove the oil supply plug slowly and set oil supply to "Max Level" slowly while ensuring that an oil film is not created in the oil supply orifice.
- ⑦ The AL30-A, AL40-A, AL50-A and AL60-A have a slight leak from the inside of the case to the oil supply orifice. Loosen the oil supply plug one turn and wait a short time for pressure to release then remove the oil supply plug. As there is a slight leak from inside the case to the oil supply orifice, set the oil supply to "Max Level" slowly, while ensuring an oil film is not created over the oil supply orifice.

When removing the oil supply plug, pressure within the case will be released, so ensure that protective goggles are equipped.

After oil is supplied, after ensuring that it is correctly positioned, the oil supply "O" ring can be returned to its previous state by gently screwing it in.

(For tightening torque, see 9. REPLACEMENT PROCEDURE)



CAUTION

- ① Check the dripping amount once a day. Dripping failure may cause damage to lubricated objects.
- ② Use clean oil to avoid dripping failure.
- ③ The lubricating amount should be less than the upper limit of oil level.
- ④ Discharge drain to avoid that drain exceeds the upper limit of the air filter. Excessive drain in the lubricator may cause dripping failure.

2. APPLICATION

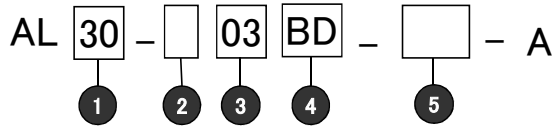
This product aims at lubricating compressed air to operate pneumatic actuator and solenoid valve smoothly.

3. SPECIFICATIONS

Model	AL10-A	AL20-A	AL30-A	AL40-A	AL40-06-A	AL50-A	AL60-A
Port size	M5	1/8, 1/4	1/4, 3/8	1/4, 3/8, 1/2	3/4	3/4, 1	1
Fluid	Air						
Proof pressure	1.5 MPa						
Max. operating pressure	1.0 MPa						
Ambient and fluid temperature	-5 ~ 60°C (Should be no freezing)						
Min. operating flow ^{Note1)} {L/min(ANR)}	4	15	1/4:30 3/8:40	1/4:30 3/8:40 1/2:50	50	190	220
Bowl capacity (cm ³)	7	25	55	135			
Recommended lubricant	Class 1 turbine oil (ISO VG32)						
Bowl material	Polycarbonate						
Bowl guard	—	Semi-standard (Steel plate)	Standard (Polycarbonate)				
Mass (kg)	0.07	0.10	0.20	0.38	0.43	0.94	1.09

Note1) The flow rate is 5 drops or greater/min under the following conditions: Inlet pressure of 0.5MPa; Class 1 turbine oil (ISO VG32); Temperature at 20°C; Oil adjustment valve fully open.

4. HOW TO ORDER

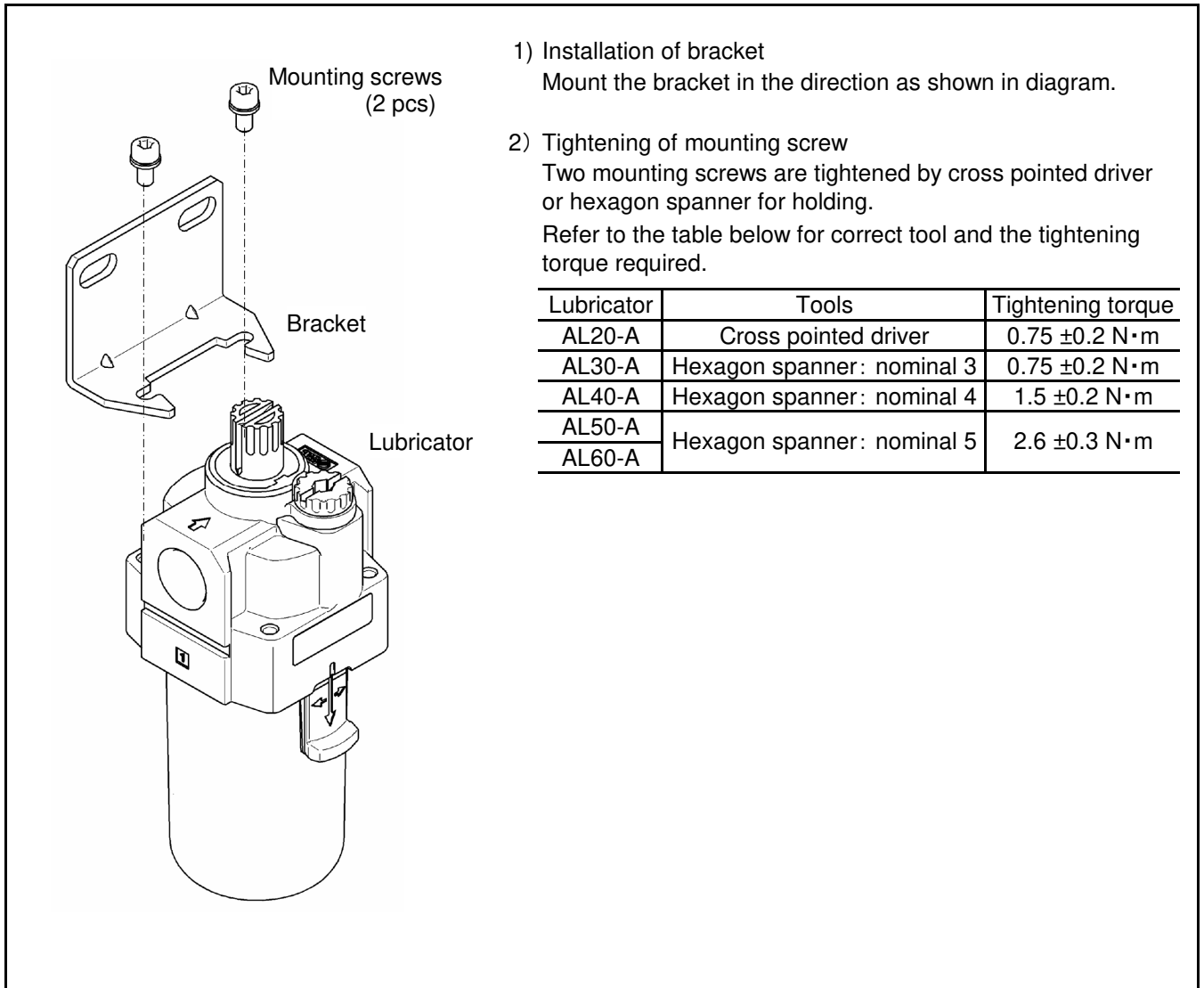


		Symbol	Description	1							
				Body size							
				10	20	30	40	50	60		
2	Thread type	Nil	Meter thread (M5)								
			Rc								
		NPT									
		G									
		+									
3	Port size	M5	M5	●	—	—	—	—	—		
		01	1/8	—	●	—	—	—	—		
		02	1/4	—	●	●	—	—	—		
		03	3/8	—	—	●	●	—	—		
		04	1/2	—	—	—	●	—	—		
		06	3/4	—	—	—	●	●	—		
		10	1	—	—	—	—	●	●		
		+									
4	Option(Mounting)	Nil	Without mounting option	●	●	●	●	●	●		
		B	With bracket	—	●	●	●	●	●		
		+									
5	Semi-standard	a	Bowl	Nil	Polycarbonate bowl	●	●	●	●	●	●
				2	Metal bowl	●	●	●	●	●	●
				6	Nylon bowl	●	●	●	●	●	●
				8	Metal bowl with sight glass	—	—	●	●	●	●
				C	With bowl guard (steel plate)	—	●	—	—	—	—
				6C	With bowl guard (steel plate) · Nylon bowl	—	●	—	—	—	—
				+							
		b	Lubricant exhaust port	Nil	With drain cock	●	●	●	●	●	●
				3	With drain cock	●	●	●	●	●	●
				3W	Drain cock with barb fitting (For φ6xφ4 nylon tube)	—	—	●	●	●	●
				+							
		c	Flow direction	Nil	Flow direction : Left to right	●	●	●	●	●	●
				R	Flow direction : Right to left	●	●	●	●	●	●
				+							
d	Pressure unit	Nil	Name plate and caution plate for bowl in imperial units : MPa, °C	●	●	●	●	●	●		
		Z	Name plate and caution plate for bowl in imperial units : psi, °F	●	●	●	●	●	●		

※ Please refer to the catalog when you select the model.

5. OPTIONAL BRACKET ASSEMBLY

1) Bracket



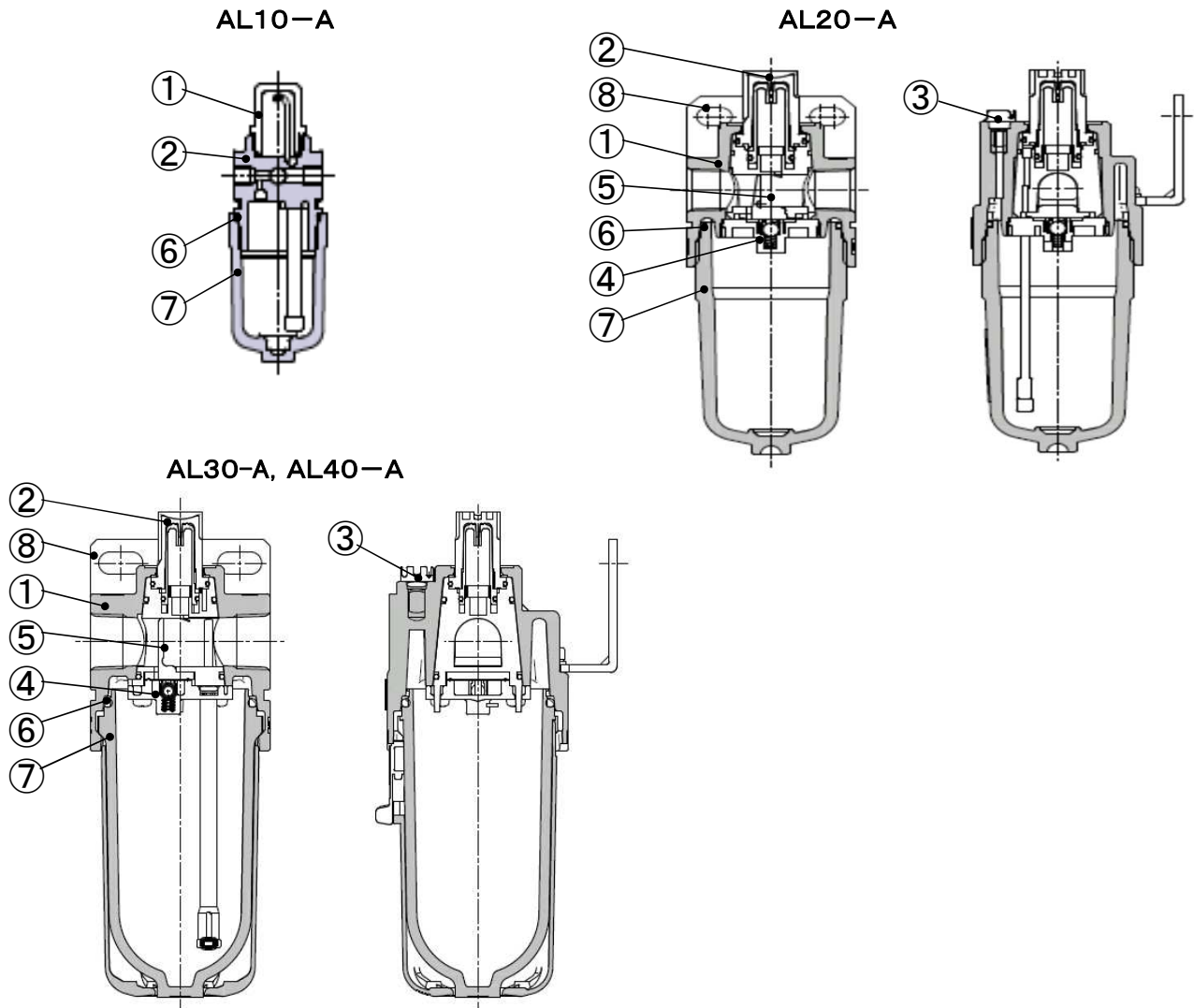
6. TROUBLESHOOTING

Refer to 「7. CONSTRUCTION / PARTS LIST」 (P10 to P11), 「10. DISASSEMBLY DRAWING」 (P22 to P25).

TROUBLE		POSSIBLE CAUSE	REMEDY
DEMARCATON	PHENOMENON		
Oil drop	Oil does not drop while there is air flow.	1. Opposite flow direction or opposite installation of lubricator.	1. Install piping or lubricator correctly as shown in manual.
		2. The amount of oil is insufficient.	2. Supply the correct amount of oil.
		3. The amount of air is insufficient.	3. Select the lubricator whose size meets the operating flow rate.
		4. The damper is broken.	4. Replace the damper.
		5. The oil adjustment valve is closed.	5. Open the oil adjustment valve.
		6. Air leaks from the bowl or the lubrication plug.	6. Replace the bowl packing or lubrication plug assembly.
		7. The element is clogged.	7. Replace the damper retainer assembly.
		8. Air leaks from the sight dome.	8. Replace the sight dome assembly.
	Air is mixed in oil drops.	1. The siphon tube seal is broken.	1. Replace the damper retainer assembly.
		2. Oil is running out.	2. Supply the correct amount of oil.
Air leaks	Air or oil leaks from the sight dome.	1. The sight dome is broken.	1. Replace the sight dome assembly.
		2. The sight dome O ring is broken.	2. Replace the sight dome assembly.
	Air leaks from lubrication plug. (AL20-A~60-A)	1. The lubrication plug O ring is broken.	1. Replace the lubrication plug assembly.
	Air leaks between the bowl and the body.	1. The bowl packing is broken.	1. Replace the bowl packing with new one or grease up after assembly.
	Air leaks from the bowl.	1. The bowl is broken.	1. Replace the bowl assembly with new one or metal bowl.

Note) The grease used recommends ENEOS Corporation diamond multipurpose No.2 (AL10-A), fluorine grease (AL20-A~60-A).

7. CONSTRUCTION / PARTS LIST



Component Parts

No.	Description	Material	Note	Applicable model
①	Body	Zinc die cast	Urban white 1	AL10-A
		Aluminium die casting	Urban white 1	AL20-A~40-A

Option / Replacement Parts

No.	Description	Material	Part No.				
			AL10-A	AL20-A	AL30-A	AL40-A	AL40-06-A
②	^{Note1)} Sight dome assembly	Polycarbonate	AL10P-080AS	AL20P-080AS			
③	Lubrication plug assembly	—	—	AL22P-060AS	AL32P-060AS	AL42P-060AS	
④	^{Note2)} Damper retainer assembly	—	—	AL20P-030AS	AL30P-030AS	AL40P-030AS	
⑤	Damper	Synthetic resin	—	AL20P-040S	AL30P-040S	AL40P-040S	
⑥	Bowl packing	NBR	C1SFP-260S	C2SFP-260S	C32FP-260S	C42FP-260S	
⑦	Bowl assembly	Polycarbonate	Refer to "8. SPECIFICATIONS OF BOWL ASSEMBLY" (P12 to P17)				
⑧	^{Note3)} Bracket assembly	Steel plate	—	AF22P-050AS	AF32P-050AS	AF42P-050AS	AF42P-070AS

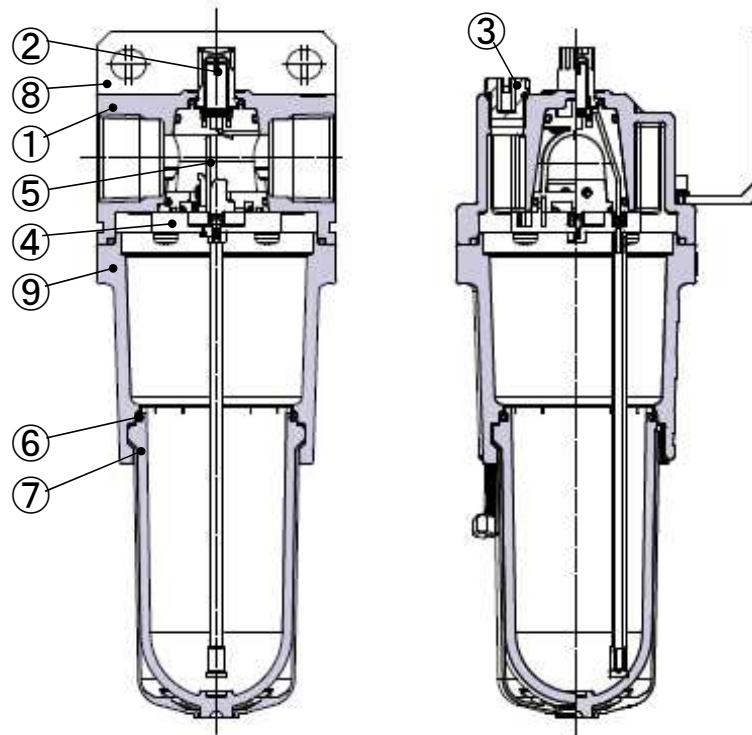
Note 1) The product number of the nylon specification(Material:PA) applies "-6" to the part number suffix.
Example: AL20P-080AS-6

Note 2) The product number of damper retainer assembly when metal bowl with sight glass applies "-8" to the part number suffix. Example: AL20P-030AS-8

Note 3) Bracket with mounting screws.(2pcs)

Note 4) The number in the table is corresponding to the number in structural drawing (above-mentioned figure) and "8. SPECIFICATIONS OF BOWL ASSEMBLY" (P12 to P17), "10. DISASSEMBLY DRAWING" (P22 to P25).

AL50-A, 60-A



Component Parts

No.	Description	Material	Note
①	Body	Aluminium die casting	Urban white 1
⑨	Housing	Aluminium die casting	Urban white 1

Option / Replacement Parts

No.	Description	Material	Part No.	
			AL50-A	AL60-A
②	^{Note1)} Sight dome assembly	Polycarbonate	AL20P-080AS	
③	Lubrication plug assembly	—	AL42P-060AS	
④	^{Note2)} Damper retainer assembly	—	AL50P-030AS	AL60P-030AS
⑤	Damper assembly	Synthetic resin	AL50P-040AS	AL60P-040AS
⑥	Bowl packing	NBR	C42FP-260S	
⑦	Bowl assembly	Polycarbonate	Refer to "8. SPECIFICATIONS OF BOWL ASSEMBLY" (P12 to P17)	
⑧	^{Note3)} Bracket assembly	Steel plate	AF52P-050AS	

Note 1) The product number of the nylon specification(Material: PA) applies "-6" to the part number suffix.
Example: AL20P-080AS-6

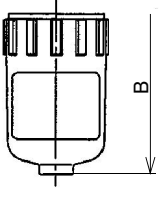
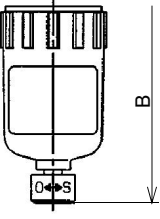
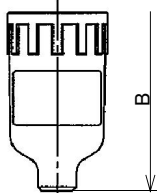
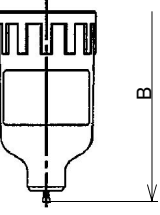
Note 2) The product number of damper retainer assembly when metal bowl with sight glass applies "-8" to the part number suffix. Example: AL20P-030AS-8

Note 3) Bracket with mounting screws.(2pcs)

Note 4) The number in the table is corresponding to the number in structural drawing (above-mentioned figure) and "8. SPECIFICATIONS OF BOWL ASSEMBLY" (P12 to P17), "10. DISASSEMBLY DRAWING" (P22 to P25).

8. SPECIFICATIONS OF BOWL ASSEMBLY

1) Bowl assembly for AL10-A

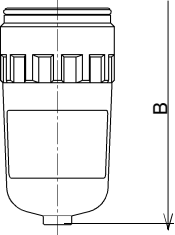
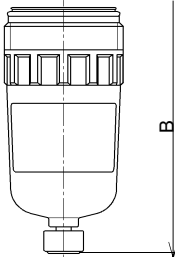
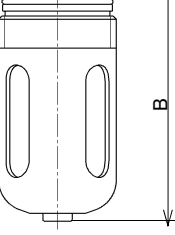
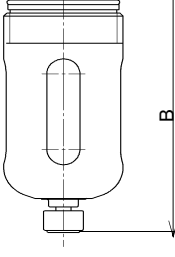
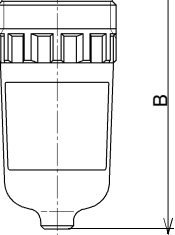
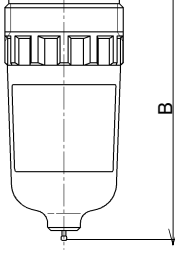
Semi-standard	—	6	3	36
External appearance drawing and part no.	Semi-standard 「—」 (Standard) ⑦Part no. C1SL(-Z)-A		Semi-standard 「3」 ⑦Part no. C1SL-3(Z)-A	
	Semi-standard 「6」 ⑦Part no. C1SL-6(Z)-A		Semi-standard 「36」 ⑦Part no. C1SL-36(Z)-A	
Semi-standard	2	23		
External appearance drawing and part no.	⑦Part no. C1SL-2-A		⑦Part no. C1SL-23-A	
				

Note 1) B in the table shows the distance from inlet piping centreline to drain port. Refer to "11. DIMENSIONS" (P26).

Note 2) "Z" of the part with no. ⑦ is semi-standard for indicated unit of pressure and temperature, which is psi and °F.

Note 3) The symbol for option and semi-standard are described as "4. HOW TO ORDER" (P7).

2) Bowl assembly for AL20-A

Semi-standard	—	6	3	36		
External appearance drawing and part no.	Semi-standard 「—」 (Standard)					
	Port thread	⑦Part no.			Semi-standard 「3」	
	Rc	C2SL-A			Port thread	⑦Part no.
	G				C2SL-3-A	
NPT	C2SL(-Z)-A	NPT	C2SL-3(Z)-A			
External appearance drawing and part no.	Semi-standard 「6」					
	Port thread	⑦Part no.			Semi-standard 「3C」	
	Rc	C2SL-6-A			Port thread	⑦Part no.
	G				C2SL-3C-A	
NPT	C2SL-6(Z)-A	NPT	C2SL-3C(Z)-A			
External appearance drawing and part no.	Semi-standard 「6C」					
	Port thread	⑦Part no.			Semi-standard 「23」	
	Rc	C2SL-6C-A			Port thread	⑦Part no.
	G				C2SL-23-A	
NPT	C2SL-6C(Z)-A	NPT	C2SL-23(Z)-A			

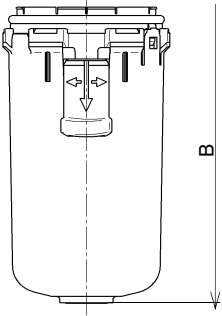
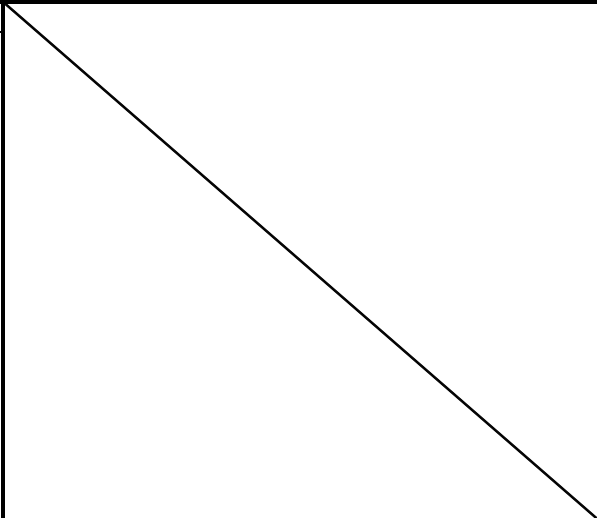
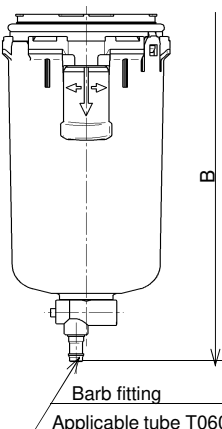
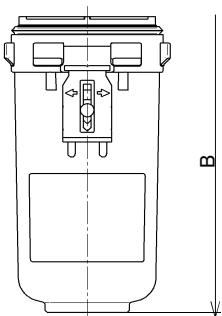
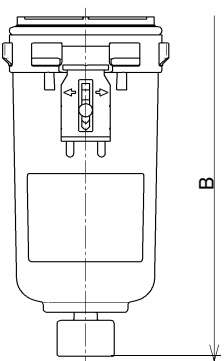
Note 1) B in the table shows the distance from inlet piping centreline to drain port. Refer to "11. DIMENSIONS" (P26).

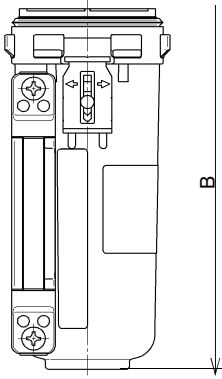
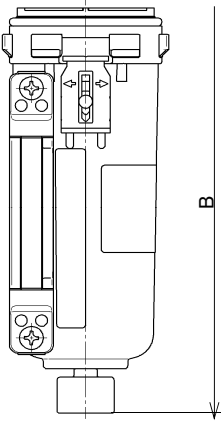
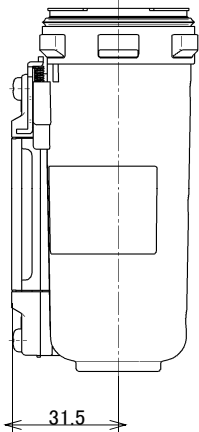
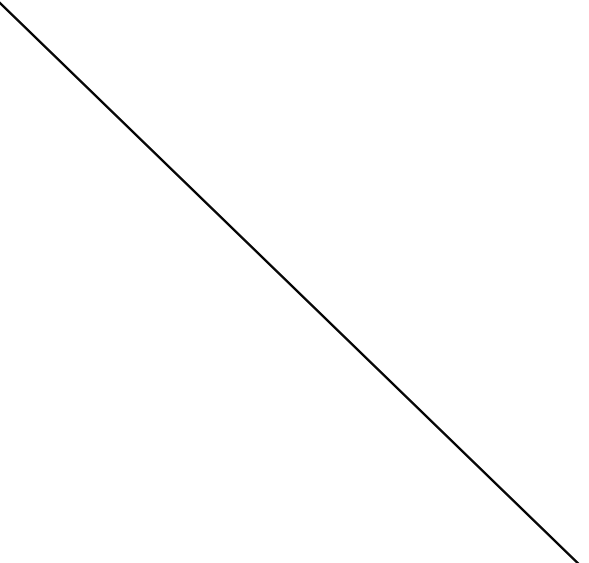
Note 2) The part with no. ⑦ includes ⑥ Bowl packing. Refer to "10. DISASSEMBLY DRAWING" (P22 to P25).

Note 3) "Z" of the part with no. ⑦ is semi-standard for indicated unit of pressure and temperature, which is psi and °F.

Note 4) The symbol for option and semi-standard are described as "4. HOW TO ORDER" (P7).

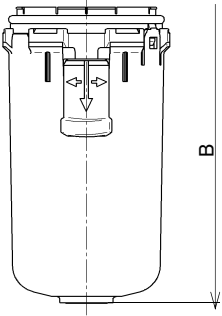
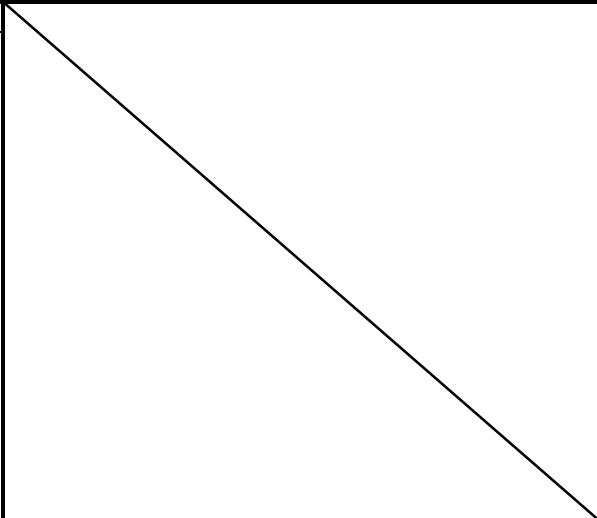
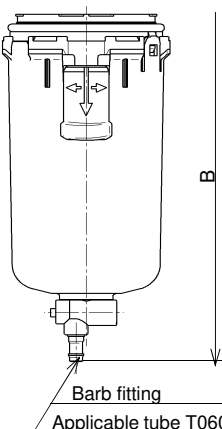
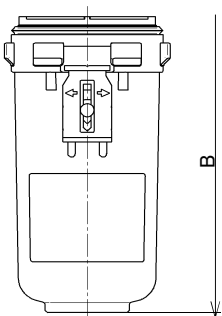
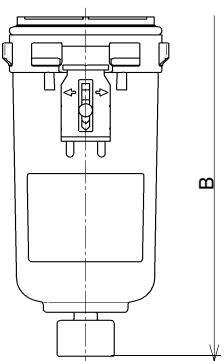
3) Bowl assembly for AL30-A

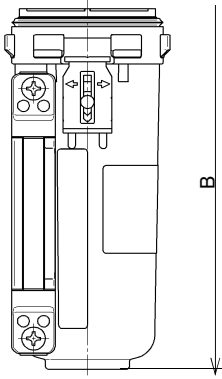
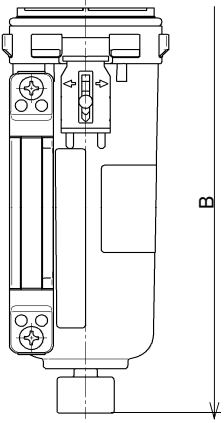
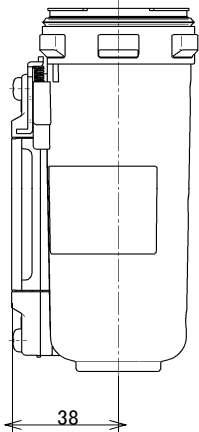
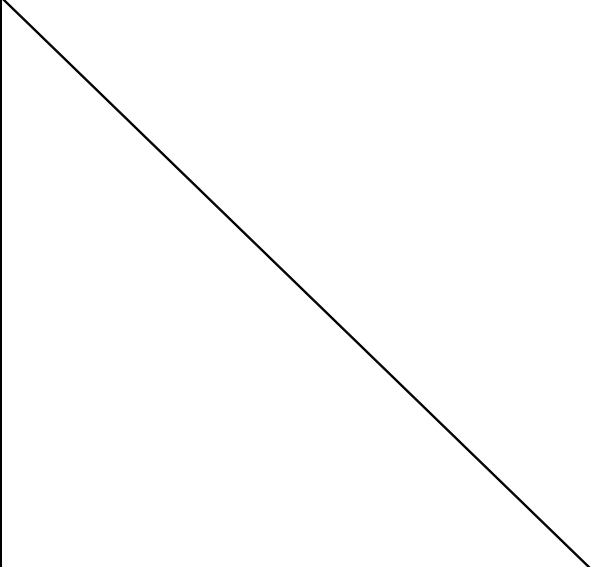
Semi-standard	—	6	3	36	
External appearance drawing and part no.	Semi-standard 「—」 (Standard)			Semi-standard 「3」	
	Port thread	⑦Part no.		Port thread	⑦Part no.
	Rc	C3SL-A		Rc	C3SL-3-A
	G	C3SL(-Z)-A		G	C3SL-3(Z)-A
	Semi-standard 「6」		Semi-standard 「36」		
	Port thread	⑦Part no.	Port thread	⑦Part no.	
	Rc	C3SL-6-A	Rc	C3SL-36-A	
	G	C3SL-6(Z)-A	G	C3SL-36(Z)-A	
	NPT	C3SL-6(Z)-A	NPT	C3SL-36(Z)-A	
Semi-standard	3W	36W			
External appearance drawing and part no.	Semi-standard 「3W」				
	Port thread	⑦Part no.			
	Rc	C3SL-3W-A			
	G	C3SL-3W(Z)-A			
	Semi-standard 「36W」				
	Port thread	⑦Part no.			
	Rc	C3SL-36W-A			
	G	C3SL-36W(Z)-A			
	NPT	C3SL-36W(Z)-A			
		 <p>Barb fitting Applicable tube T0604</p>			
Semi-standard	2	23			
External appearance drawing and part no.	Semi-standard 「2」		Semi-standard 「23」		
	Port thread	⑦Part no.	Port thread	⑦Part no.	
	Rc	C3SL-2-A	Rc	C3SL-23-A	
	G	C3SL-2(Z)-A	G	C3SL-23(Z)-A	
	NPT	C3SL-2(Z)-A	NPT	C3SL-23(Z)-A	
					

Semi-standard	8	38																
External appearance drawing and part no.	<p>Semi-standard 「8」</p> <table border="1" data-bbox="359 219 643 365"> <tr> <td>Port thread</td> <td>⑦Part no.</td> </tr> <tr> <td>Rc</td> <td>C3LL-8-A</td> </tr> <tr> <td>G</td> <td></td> </tr> <tr> <td>NPT</td> <td>C3LL-8(Z)-A</td> </tr> </table> 	Port thread	⑦Part no.	Rc	C3LL-8-A	G		NPT	C3LL-8(Z)-A	<p>Semi-standard 「38」</p> <table border="1" data-bbox="957 219 1241 365"> <tr> <td>Port thread</td> <td>⑦Part no.</td> </tr> <tr> <td>Rc</td> <td>C3LL-38-A</td> </tr> <tr> <td>G</td> <td></td> </tr> <tr> <td>NPT</td> <td>C3LL-38(Z)-A</td> </tr> </table> 	Port thread	⑦Part no.	Rc	C3LL-38-A	G		NPT	C3LL-38(Z)-A
Port thread	⑦Part no.																	
Rc	C3LL-8-A																	
G																		
NPT	C3LL-8(Z)-A																	
Port thread	⑦Part no.																	
Rc	C3LL-38-A																	
G																		
NPT	C3LL-38(Z)-A																	
External appearance drawing	<p>Metal bowl with sight glass side view</p> 																	

- Note 1) B in the table shows the distance from inlet piping centreline to drain port. Refer to "11. DIMENSIONS" (P26).
Note 2) The part with no. ⑦ includes ⑥ Bowl packing. Refer to "10. DISASSEMBLY DRAWING" (P22 to P25).
Note 3) "Z" of the part with no. ⑦ is semi-standard for indicated unit of pressure and temperature, which is psi and °F.
Note 4) The symbol for option and semi-standard are described as "4. HOW TO ORDER" (P7).

4) Bowl assembly for AL40,50,60-A

Semi-standard	—	6	3	36	
External appearance drawing and part no.	Semi-standard 「—」 (Standard)			Semi-standard 「3」	
	Port thread	⑦Part no.		Port thread	⑦Part no.
	Rc	C4SL-A		Rc	C4SL-3-A
	G	C4SL(-Z)-A		G	C4SL-3(Z)-A
	Semi-standard 「6」		Semi-standard 「36」		
	Port thread	⑦Part no.	Port thread	⑦Part no.	
	Rc	C4SL-6-A	Rc	C4SL-36-A	
	G	C4SL-6(Z)-A	G	C4SL-36(Z)-A	
	NPT	C4SL-6(Z)-A	NPT	C4SL-36(Z)-A	
Semi-standard	3W	36W			
External appearance drawing and part no.	Semi-standard 「3W」				
	Port thread	⑦Part no.			
	Rc	C4SL-3W-A			
	G	C4SL-3W(Z)-A			
	Semi-standard 「36W」				
	Port thread	⑦Part no.			
	Rc	C4SL-36W-A			
	G	C4SL-36W(Z)-A			
	NPT	C4SL-36W(Z)-A			
		 <p>Barb fitting Applicable tube T0604</p>			
Semi-standard	2	23			
External appearance drawing and part no.	Semi-standard 「2」		Semi-standard 「23」		
	Port thread	⑦Part no.	Port thread	⑦Part no.	
	Rc	C4SL-2-A	Rc	C4SL-23-A	
	G	C4SL-2(Z)-A	G	C4SL-23(Z)-A	
	NPT	C4SL-2(Z)-A	NPT	C4SL-23(Z)-A	
					

Semi-standard	8	38																
External appearance drawing and part no.	<p>Semi-standard 「8」</p> <table border="1" data-bbox="359 219 643 365"> <tr> <td>Port thread</td> <td>⑦Part no.</td> </tr> <tr> <td>Rc</td> <td>C4LL-8-A</td> </tr> <tr> <td>G</td> <td></td> </tr> <tr> <td>NPT</td> <td>C4LL-8(Z)-A</td> </tr> </table> 	Port thread	⑦Part no.	Rc	C4LL-8-A	G		NPT	C4LL-8(Z)-A	<p>Semi-standard 「38」</p> <table border="1" data-bbox="957 219 1241 365"> <tr> <td>Port thread</td> <td>⑦Part no.</td> </tr> <tr> <td>Rc</td> <td>C4LL-38-A</td> </tr> <tr> <td>G</td> <td></td> </tr> <tr> <td>NPT</td> <td>C4LL-38(Z)-A</td> </tr> </table> 	Port thread	⑦Part no.	Rc	C4LL-38-A	G		NPT	C4LL-38(Z)-A
Port thread	⑦Part no.																	
Rc	C4LL-8-A																	
G																		
NPT	C4LL-8(Z)-A																	
Port thread	⑦Part no.																	
Rc	C4LL-38-A																	
G																		
NPT	C4LL-38(Z)-A																	
External appearance drawing	<p>Metal bowl with sight glass side view</p> 																	

- Note 1) B in the table shows the distance from inlet piping centreline to drain port. Refer to "11. DIMENSIONS" (P26).
Note 2) The part with no. ⑦ includes ⑥ Bowl packing. Refer to "10. DISASSEMBLY DRAWING" (P22 to P25).
Note 3) "Z" of the part with no. ⑦ is semi-standard for indicated unit of pressure and temperature, which is psi and °F.
Note 4) The symbol for option and semi-standard are described as "4. HOW TO ORDER" (P7).

9. REPLACEMENT PROCEDURE

WARNING

- Before replacement, ensure that the lubricator is not pressurized.
- Replace referring to "10. DISASSEMBLY DRAWING" (P22 to P25).
- After replacement, ensure that specified function is satisfied and external leakage is not found before starting operation.

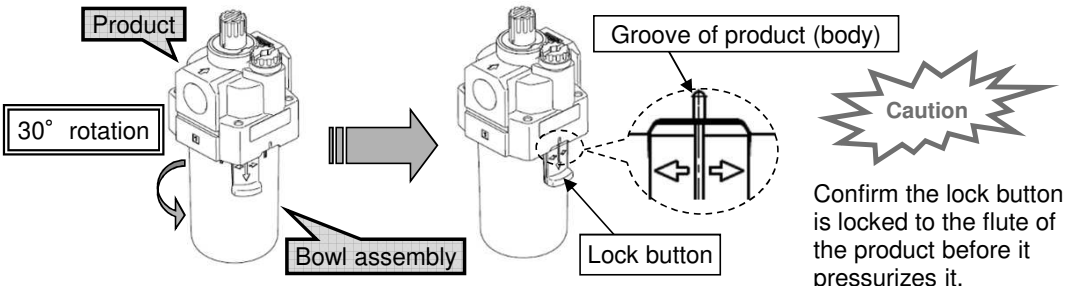
1) Bowl assembly, Sight dome assembly

Applicable model	Process	Procedure	Tool	Check item
AL10-A	Disassembly	1. Remove the bowl assembly. Hold the bowl assembly by hand and rotate counterclockwise to remove the bowl assembly. If the bowl assembly is tightened too much to be removed, use hook spanner until it can be loosened by hand.	(Hook spanner Nominal: 25/28)	—
		2. Remove the sight dome assembly. Rotate counterclockwise with spanner to remove the sight dome assembly.	Spanner Nominal: 14	—
	Assembly	3. Mount the bowl assembly. Hold the bowl assembly by hand and rotate clockwise. Do not use tool for mounting because the bowl may be damaged. See check item for referential tightening torque.		Referential tightening torque: 1.5 N·m
		4. Mount the sight dome assembly. Rotate clockwise with spanner to mount the sight dome assembly. Tightening torque at this time is shown on controlled item.	Spanner Nominal: 14 (Torque wrench)	Tightening torque: 1.4±0.1N·m

2) Bowl assembly, Damper retainer assembly, Damper, Sight dome assembly

Applicable model	Process	Procedure	Tool	Check item
AL20-A	Disassembly	1. Remove the bowl assembly. Hold the bowl assembly by hand and rotate counterclockwise to remove the bowl assembly. If the bowl assembly is tightened too much to be removed, use hook spanner until it can be loosened by hand.	SMC's special spanner P/N: 1129129 (Recommended)	—
		2. Close the oil adjustment valve (sight dome) fully. Rotate the oil adjustment valve clockwise manually until rotation stops, do not over tighten.	—	—
		3. Disconnect damper retainer assembly. Hold the damper retainer assembly by round cutting pliers and rotate anticlockwise.	Round cutting pliers Nominal: 125 or 150	—
		4. Disconnect O ring, damper, holder assembly, steel ball, sight dome assembly and spacer. Push the sight dome assembly forward to the body by hand for disconnection. The holder assembly and the sight dome assembly can be separated away by hand as well, but at the time the attention has to be paid not to lose the steel balls between them. Damper can be pulled out by pincette.	Pincette	—
	Assembly	5. Insert the spacer to the sight dome assembly.	—	—
		6. Connect the sight dome assembly, the steel balls and the holder assembly. After inserting the steel balls into the path hole of oil on the holder assembly, put the sight dome assembly into the holder assembly by meeting zero point mark of both holder assembly and the sight dome assembly.	—	Zero point mark on the holder assembly shall meet with zero point mark on the sight dome assembly.
		7. Insert the damper into the holder assembly. For insertion, meet the setting concave (damper) and convex (holder assembly).	—	Setting concave on the damper should meet with the setting convex on the holder assembly.

Applicable model	Process	Procedure	Tool	Check item
AL20-A	Assembly	8. Insert the assemblies ⑤~⑦ mentioned above (sight dome + spacer + steel ball + holder assembly + damper) into the body. For insertion, meet the setting convex and concave on the body holder. Proper insertion holds the face of the holder and the body flat.	—	Setting concave on the body should meet with the setting convex of the holder. The face of the holder and the body is made flat.
		9. Mount the damper retainer assembly. Hold the damper retainer assembly by round cutting pliers and rotate clockwise. tightening torque at this time is shown on controlled item.	Round cutting pliers Nominal: 125 or 150	Tightening torque: 1.4±0.1N·m
		10. Mount the bowl assembly. Hold the bowl assembly by hand and rotate clockwise. Do not use tool for mounting because the bowl may be damaged. See check item for referential tightening torque.	—	Referential tightening torque: 2.1 N·m
AL30-A AL40-A	Disassembly	1. Remove the bowl assembly. Press the lock button on the case assembly downwards, turn it either clockwise or counterclockwise by 30° and remove the bowl assembly.	—	—
		2. Close the oil adjustment valve (sight dome) fully. Rotate the oil adjustment valve clockwise manually until rotation stops, do not over tighten.	—	—
		3. Disconnect the damper retainer assembly. Loosen and remove four cross recessed round screws by Cross pointed driver to disconnect the damper retainer assembly. At this time, the attention has to be paid not to lose O ring between the damper retainer assembly and the holder assembly.	Cross pointed driver	—
		4. Disconnect damper, holder assembly, sight dome assembly and spacer. Push the sight dome assembly forward to the body by hand for disconnection. The holder assembly and the sight dome assembly can be separated away by hand as well. Damper can be pulled out by pincette.	Pincette	—
	Assembly	5. Insert the spacer to the sigh dome assembly.	—	—
		6. Connect the sight dome assembly with the holder assembly. Put the sight dome assembly into the holder assembly by meeting zero point mark of both holder assembly and the sight dome assembly.	—	Zero point mark on the holder assembly should meet with zero point mark on the sight dome assembly.
		7. Insert the damper into the holder assembly. For insertion, the shape of the damper is matched to the shape of the convex part of the holder assembly.	—	Setting the shape of the damper should meet with the setting convex of the holder assembly.
		8. Insert the assemblies ⑤~⑦ mentioned above (sight dome + spacer + holder assembly + damper) into the body. For insertion, meet the setting convex and concave on the body holder. Proper insertion holds the face of the holder and the body flat.	—	Setting concave on the body should meet with the setting convex of the holder. The face of the holder and the body is made flat.
		9. Mount the damper retainer assembly. Place the damper retainer assembly so that the oil path convex (damper holder assembly) and concave (holder) would meet, and then fix it by four cross recessed round head screw by Cross pointed driver. tightening torque at this time is shown on controlled item. And the screw which is tightened next after first tightened screw shall be what is located opposite the previous screw.	Cross pointed driver	Tightening torque: AL30: 0.4 ±0.1 N·m AL40: 0.7 ±0.2 N·m

Applicable model	Process	Procedure	Tool	Check item
AL30-A AL40-A	Assembly	10. Mount the bowl assembly. Insert the bowl assembly into the body by using individual setting mark and rotate clock or anticlockwise by 30°(until the lock button is released). If the release of the lock button is confirmed, mount of the bowl assembly is completed.	—	Lock button is up.
				
AL50-A AL60-A	Disassembly	1. Disconnect the housing including the bowl assembly. Loosen four hexagon socket head bolts by hexagon wrench to disconnect the housing (including the bowl assembly) and O ring.	Hexagon wrench Nominal : 5	—
		2. Close the oil needle stud (outer of the sight dome) fully. Rotate the oil needle stud clockwise by manual until feeling the end of rotation with light force.	—	—
		3. Disconnect the damper retainer assembly. Loosen and remove four cross recessed round screws by Cross pointed driver to disconnect the damper retainer assembly.	Cross pointed driver	—
		4. Disconnect O ring, damper assembly, holder assembly, sight dome assembly and spacer. Push the sight dome assembly forward to the body by hand for disconnection. And the holder assembly and the sight dome assembly can be separated away by hand as well.	—	—
	Assembly	5. Insert the spacer into the assembly.	—	—
		6. Connect the sight dome assembly with the holder assembly. Put the sight dome assembly into the holder assembly by meeting zero point mark of both holder assembly and the sight dome assembly.	—	Zero point mark on the holder assembly shall meet with zero point mark on the sight dome assembly.
		7. Insert the damper into the holder assembly. For insertion, the setting hole of the damper assembly is matched to the convex part of the holder assembly.	—	Setting the setting hole of the damper assembly shall meet with the convex of the holder assembly.
		8. Insert the assemblies ⑤~⑦ mentioned above (sight dome+spacer+holder assembly+damper assembly) For insertion, meet the setting convex and concave on the body holder. Proper insertion makes the face of the holder and the body flat.	—	Setting concave on the body shall meet with the Setting convex of the holder. The face of the holder and the body is made flat.
		9. Install O ring to the holder assembly.	—	—
		10. Mount the damper retainer assembly. Place the damper retainer assembly so that the oil path convex (damper holder assembly) and concave (holder) could meet, and then fix it by four cross recessed round head screw by Cross pointed driver. tightening torque at this time is shown on controlled item. And the screw which is tightened next after first tightened screw shall be what is located at cross corner of first one.	Cross pointed driver	Tightening torque AL50-A : 1.4±0.1 N·m AL60-A : 1.4±0.1 N·m
		11. Install O ring to the body.	—	—

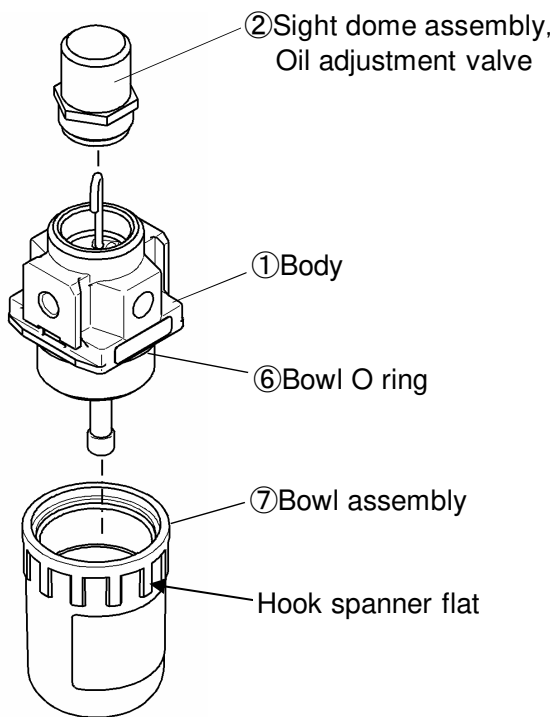
Applicable model	Process	Procedure	Tool	Check item
AL50-A AL60-A	Assembly	12. Mount the housing including the bowl assembly. Place the housing including the bowl assembly on the body at the position with configuration match by checking the appearance of them and fix it by four hexagon socket head bolts by hexagon wrench. tightening torque at this time is shown on controlled item. And the screw which is tightened next after first tightened screw shall be what is located at cross corner of first one.	Hexagon wrench Nominal : 5	Tightening torque AL50-A : 4.5±1 N·m AL60-A : 4.5±1 N·m

3) Lubrication plug assembly

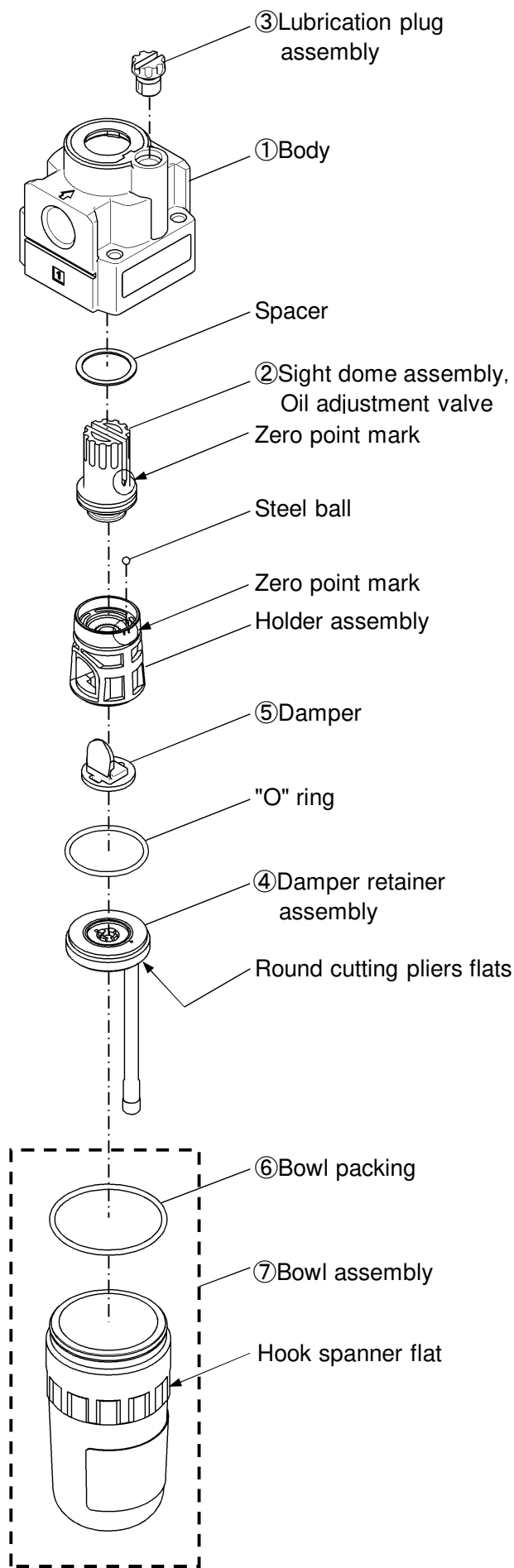
Applicable model	Process	Procedure	Tool	Check item
AL20-A AL30-A AL40-A AL50-A AL60-A	Disassembly	1. Disconnect the lubrication plug assembly. Insert standard driver into the groove on the top of lubrication plug and rotate anticlockwise to disconnect the lubrication plug assembly from the body.	Standard driver	—
	Assembly	2. Mount the lubrication plug assembly. Insert standard driver into the groove on the top of lubrication plug and rotate clockwise to fix the lubrication plug assembly to the body. tightening torque at this time is shown on controlled item.	Standard driver	Tightening torque AL20-A : 0.3±0.05 N·m AL30-A : 0.4±0.05 N·m AL40-A~60-A :

10. DISASSEMBLY DRAWING

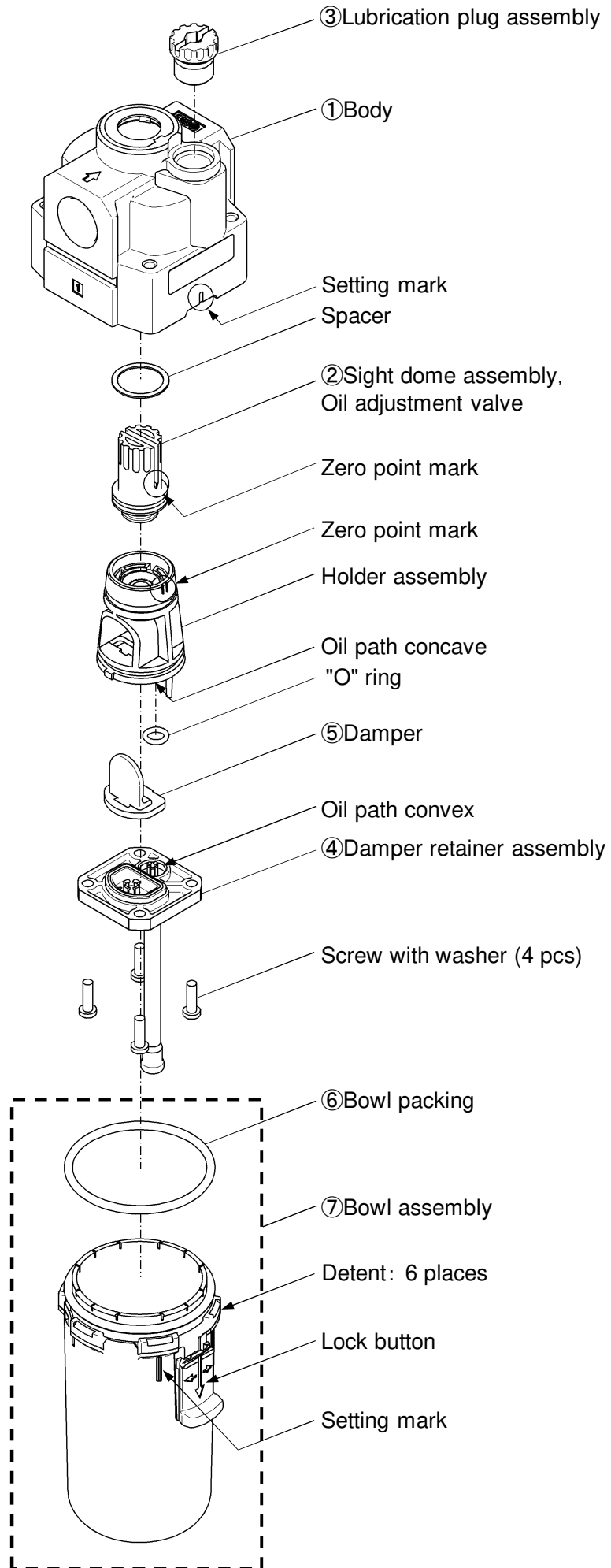
1) AL10-A



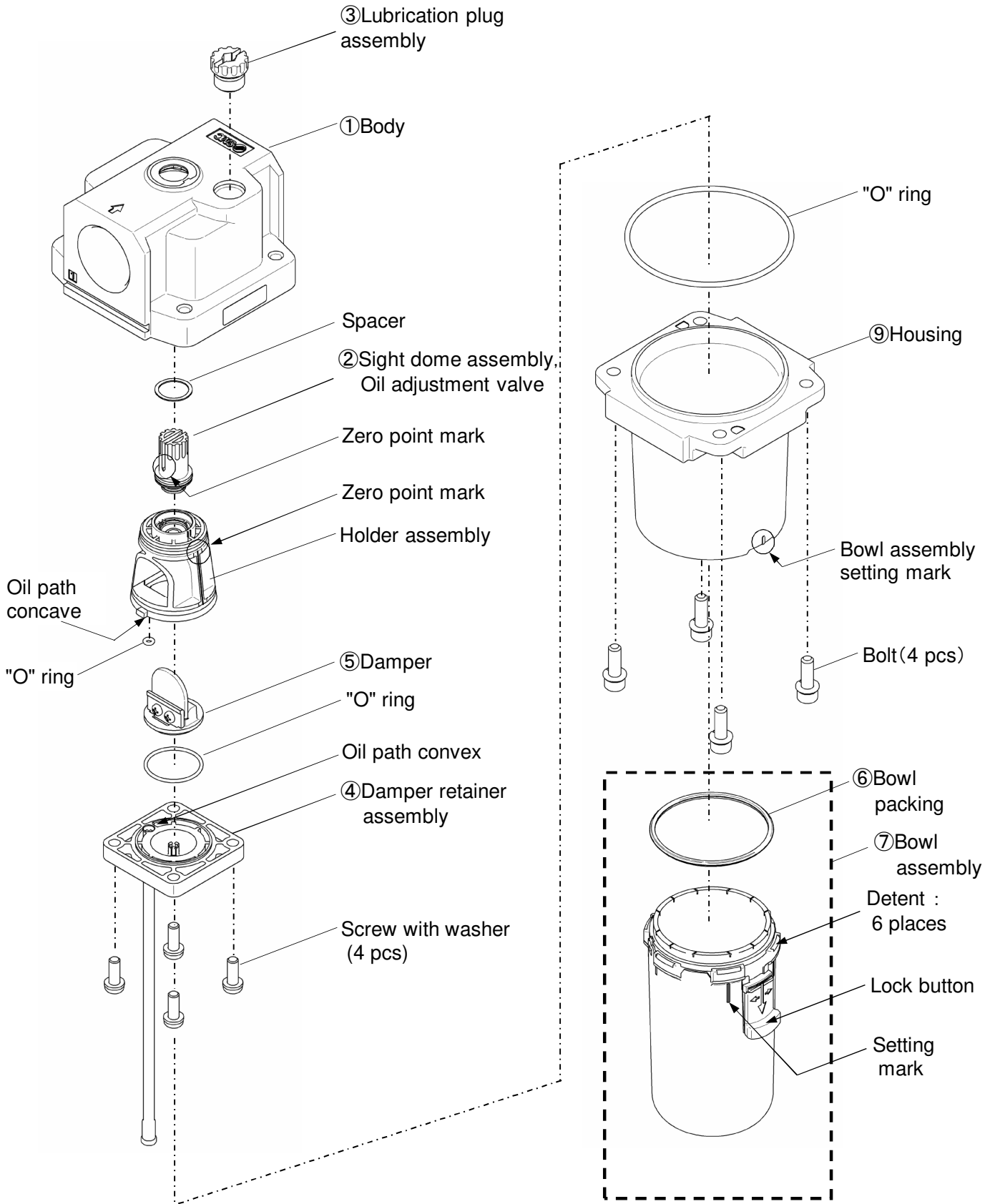
2) AL20-A



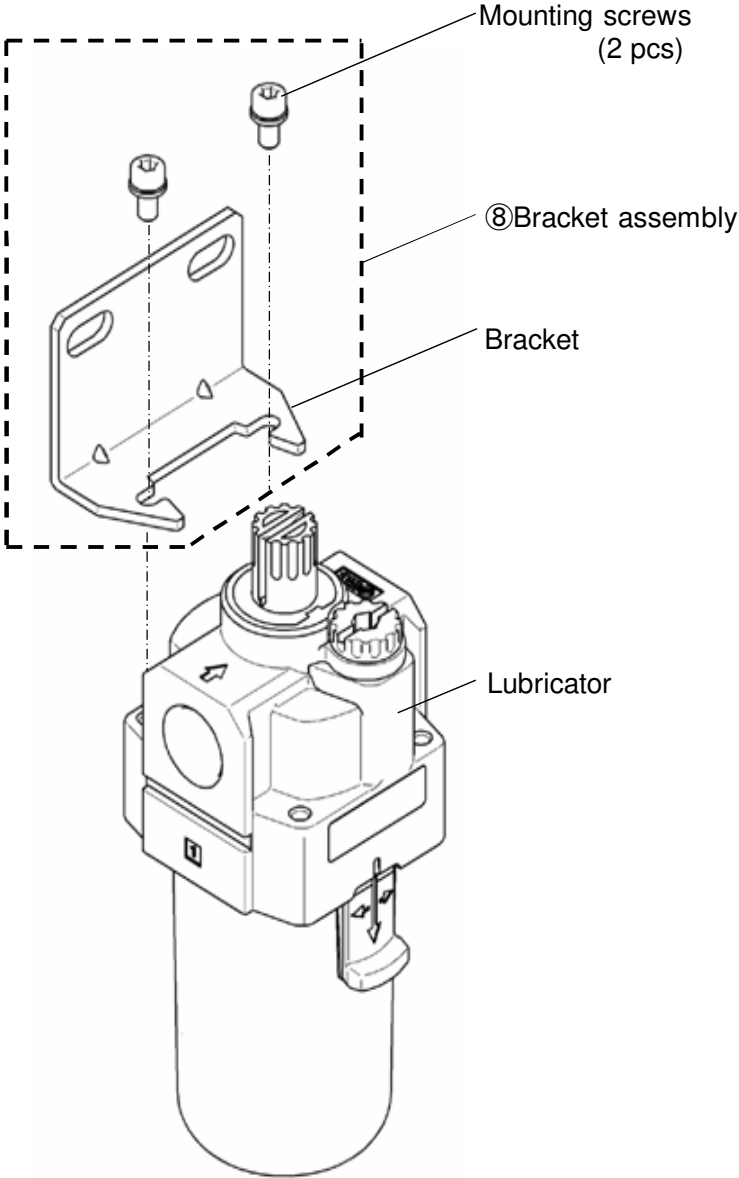
3) AL30,40-A



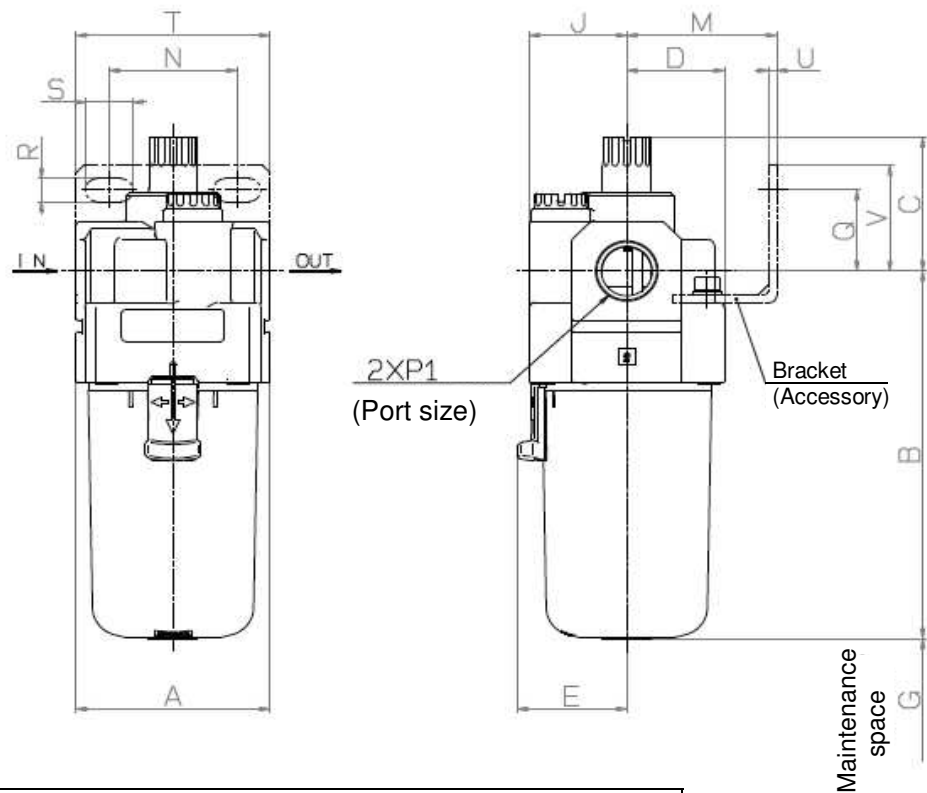
4) AL50,60-A



5) AL20-A~AL60-A Bracket assembly disassembly drawing



11. DIMENSIONS



Model	Standard specifications							
	P1	A	B	C	D	E	G	J
AL10-A	M5X0.8	25	51.5	25.5	12.5	—	35	12.5
AL20-A	1/8·1/4	40	79.3	35.9	20	—	60	20
AL30-A	1/4·3/8	53	104.1	38.1	26.7	30	80	26.7
AL40-A	1/4·3/8·1/2	70	136.1	39.8	35.5	38.4	110	35.5
AL40-06-A	3/4	75	138.1	37.8	35.5	38.4	110	35.5
AL50-A	3/4·1	90	209	41.2	45	—	110	45
AL60-A	1	95	223	44.7	47.5	—	110	47.5

Model	Bracket mount dimensions							
	M	N	Q	R	S	T	U	V
AL10-A	-	-	-	-	-	-	-	-
AL20-A	30	27	22	5.4	8.4	40	2.3	28
AL30-A	41	35	23	6.5	13	53	2.3	30
AL40-A	50	52	26	8.5	12.5	70	2.3	35
AL40-06-A	50	52	25	8.5	12.5	70	2.3	34
AL50-A	70	66	35	11	13	90	3.2	47
AL60-A	70	66	35	11	13	90	3.2	47

Model	Semi-standard specifications					
	With drain cock	Drain cock with barb fitting	Metal bowl	Metal bowl, drain cock	Metal bowl with sight glass	Metal bowl with sight glass and drain cock
	B	B	B	B	B	B
AL10-A	59.9	—	56.3	59.3	—	—
AL20-A	87.7	—	84.5	87.5	—	—
AL30-A	115.1	123.6	104.1	117.6	124.1	137.6
AL40-A	147.1	155.6	136.1	149.6	156.1	169.6
AL40-06-A	149.1	157.6	138.1	151.6	158.1	171.6
AL50-A	220.1	228.6	209.1	222.6	229.1	246.2
AL60-A	234.1	242.6	223.1	236.6	243.1	256.6

Note 1) The specifications of auto-drain and optional bowl assembly are described in 「8. SPECIFICATIONS OF BOWL ASSEMBLY」 (P12 to P17).

Revision history

- A** The tightening torque value of the element
assy is changed. 2017.4
- B** • P4 Addition:grease type,P9 Change:
grease type.
- P5 Correction: 「Air Source」 CATION②
 - P6 Correction:Filtration, Oil mist density at the
out side, Flow rate, P8 Correction: bracket assy
drawing.
 - P18 Correction:dimension of metal bowl
with level gauge.
 - P24 Deletion:bracket assy disassembly
drawing.
 - 12. DIMENSIONS Addition:option,
Change: Shape of bracket assembly. 2018.2
- C** • P4 Addition: 「Piping」 WARNING⑤
- P9 Change: company name (grease)
 - P19 Change:bowl tightening torque(AL20-A)
 - P26 Correction: N, S dimensions(AL30~40-A)
- 2021.12

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